

MISSOURI DEPARTMENT OF TRANSPORTATION

FOCUS

STRATEGIC INITIATIVES FOR CONTINUOUS IMPROVEMENT

October 2020

SAFETY • SERVICE • STABILITY





MISSOURI

Department of Transportation

September 2020



ASPIRATION

Our mission is to provide a world-class transportation system that is safe, innovative, reliable, and dedicated to a prosperous Missouri

THEMES

Safety

Moving
Missourians Safely

Service

Providing Outstanding Customer
Service, Delivering Efficient and
Innovative Transportation Projects,
Operating a Reliable
Transportation System

Stability

Managing Our Assets, Stabilizing
Resources and Engaging our
Workforce, Building a Prosperous
Economy for All Missourians

INITIATIVES

- Improve Work Zone and System-wide Safety with Autonomous Truck-Mounted Attenuators
- Improve Partnerships with Other Agencies and Leverage Private Sector
- Predictive Analytics
 - Optimize winter operations
 - Traffic Management on I-270 in St. Louis
- Pandemic Response to Maintaining Employee Safety and Health

- Improve Project Management Tools
 - Maintenance Management Information System
- Facilities Optimization Strategy Implementation
- Fleet Safety and Utilization with Fleet Telematics
- Implement Enterprise Resource Planning (ERP)
- Update of the State Freight and Rail Plan
- Pandemic Response to Maintaining Essential Services

- Increase Employee Engagement and Recognition
 - Training and Certification
- Research and Deploy Alternative Funding Solutions with Cross-cabinet Collaboration
- Leverage Innovations to Reduce Costs and Improve Service Quality
- SIMS Modernization - Final Phase
- Federal Aid Computer System (FACS) - Phase II
- Pandemic Response to Progressive Cost Control

RANKINGS

1-10 = A

11-20 = B

21-30 = C

31-40 = D

41-50 = F

A

Road Conditions

Current Performance = 92 percent major highways (5,546 miles) in good condition. 80 percent of minor highways (28,313) in good condition.
National Ranking = Missouri had the 10th best pavements on the National Highway System. (FHWA Highway Statistics)

A

Customer Satisfaction

Current Performance = 77 percent satisfied customers
National Ranking = Missouri trails the highest rated company on the American Customer Satisfaction Index by only 9 percent.

A

Project Management

Current Performance = Missouri road and bridge projects were delivered within 1.3 percent of the award amount and 92 percent were delivered on-time.
National Ranking = Not available.

A

Infrastructure for Business

Current Performance = No internal measure
National Ranking = A CNBC business study ranks Missouri's infrastructure as the 7th best for business.

A

Administrative Costs

Current Performance = \$2,187 cost per mile
National Ranking = Missouri has the 3rd lowest administrative cost per mile.
**2018-2019 data is not available*

B

Congestion (travel time index)

Current Performance = Kansas City - 1.15 St. Louis - 1.15
National Ranking = Out of 101 urban areas, Kansas City and St. Louis both ranked at 23rd as some of the least congested areas in the U.S. (Texas Transportation Institute)

D

Number of Fatalities

Current Performance = 921 fatalities
National Ranking = Only 14 states experienced more motor vehicle deaths ranking Missouri 36th. (National Safety Council)

D

Bridge Conditions

Current Performance = 9 percent of Missouri bridges in poor condition by deck area.
National Ranking = Missouri ranked 40th for the percent of bridges in poor condition by deck area. (FHWA Highway Statistics)

F

Revenue

Current Performance = \$50,184 revenue per mile
National Ranking = Missouri has the 48th lowest revenue per mile. (FHWA Highway Statistics)

F

Employee Turnover

Current Performance = 13.27 percent
National Ranking = Not available; However, **Stretch Target** = 6 percent.
(PricewaterhouseCoopers Saratoga Institute benchmark data)

MODOTVALUES

TANGIBLE RESULTS

SAFETY

Be Safe

Moving Missourians
Safely

Be Accountable

SERVICE

Be Respectful

Be Inclusive

Providing Outstanding
Customer Service

Delivering Efficient and
Innovative Transportation
Projects

Operating a Reliable
Transportation System

Be Bold

Be Better

STABILITY

Be One Team

So we can be a great
organization

Managing Our Assets

Stabilizing Resources and
Engaging our Workforce

Building a Prosperous
Economy for All Missourians

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Implement Enterprise Resource Planning - ERP (under development)	TBD	TBD	na
Update of the State Freight and Rail Plan (under development)	TBD	TBD	na
Pandemic Response to Maintaining Essential Services (under development)	TBD	TBD	na
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Leverage Innovation to Reduce Costs and Improve Service Quality (under development)	TBD	TBD	na

SAFETY

Moving Missourians Safely

- **Improve Work Zone and System-wide Safety with Autonomous Truck-mounted Attenuators**
- **Improve Partnerships with Other Agencies and Leverage Private Sector**
 - Predictive analytics to optimize winter operations resources
 - Traffic Management on I-270 in St. Louis
- **Pandemic Response to Maintaining Employee Safety and Health**

Improve Work Zone and System-wide Safety

Autonomous Truck-mounted Attenuators

SAFETY CHAMPION:

Becky Allmeroth, Chief Safety and Operations Officer

PROJECT MANAGERS:

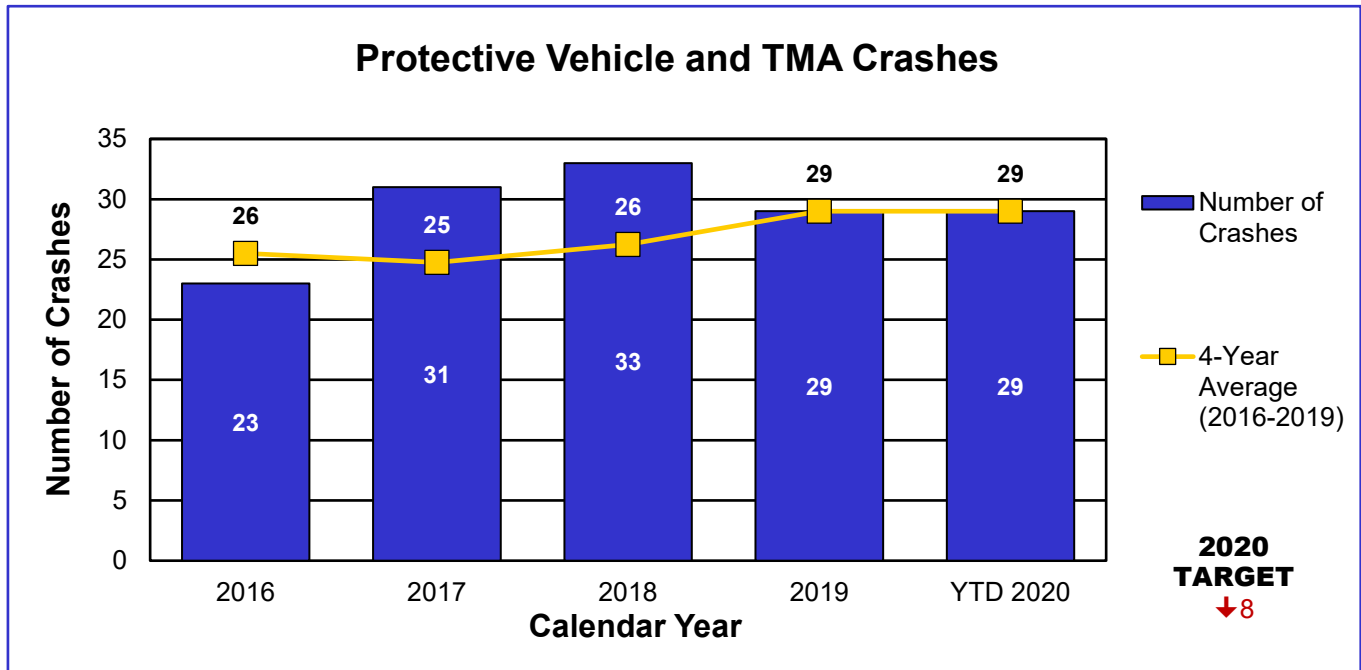
Chris Redline, District Engineer

PURPOSE OF THE PROJECT:

MoDOT's commitment to safety applies to ourselves and our customers. In 2019, our Truck Mounted Attenuators (TMA) were involved in 29 crashes. The typical TMA incident is when a driver is approaching a mobile work zone operation and crashes into our rear TMA truck. The severity of these crashes ranges from simple 'fender benders' with no injuries to complete collapse of the attenuator and total loss of the heavy-duty dump truck with severe injuries to both drivers and even death. Through the first three quarters of 2020, we have had 39 crashes. In the third quarter of 2020, there were 10 TMA crashes and seven of our employees sought medical attention due to those crashes. MoDOT is investigating the viability of driverless truck-mounted attenuators to be used in moving operations such as sweeping, striping, and pothole patching. Success of this project could pave the way to eliminate all injuries caused by drivers crashing into the rear TMA.

The project is evaluating leader-follower technology with the goal of removing operators from the rear TMA, the one most crashed into by drivers. During testing the rear TMA has a safety operator with the ability to immediately take over manual control of the truck. The driverless rear TMA simply follows the path of the staffed lead vehicle at adjustable distances. The system passed Phase 1 testing in May of 2019 but began to exhibit navigation problems during Phase 2 testing in June of 2019. Our vendor installed system upgrades late last year to correct the problems. Social distancing requirements stopped further testing since two operators need to be in the lead truck. To resume the testing, our vendor will be moving the rear TMA driverless equipment to a crew cab so the two operators can be separated by a clear flexible barrier. This change will be completed later this year and we will be ready to resume testing early in 2021 when weather allows.

Improve Work Zone and System-wide Safety



Improve Partnerships with Other State Agencies and Leverage Private Sector

Optimize Winter Operation

SAFETY CHAMPION:

Becky Allmeroth, Chief Safety and Operations Officer

PROJECT MANAGER:

Alex Wassman, Traffic Management and Operations Engineer

PURPOSE OF THE PROJECT:

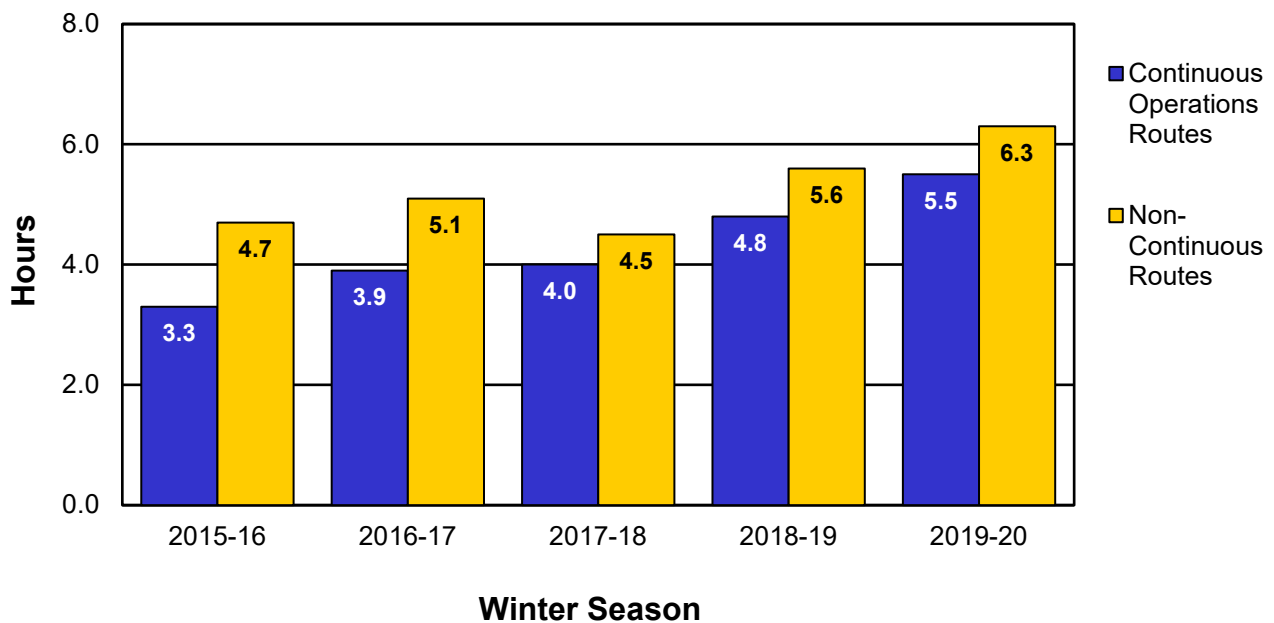
Costs associated with over or under preparedness of severe weather events aren't easily captured and are seldomly reported. Simple atmospheric weather forecasts do not tell the whole story and, as a result, MoDOT has sometimes incurred additional costs for storms which never materialized or been caught off guard when storms arrived in advance of expectations.

Road condition prediction is a better gauge for anticipating when conditions warrant treatment and advance traveler information. By partnering with FHWA on the Integrated Modeling for Road Condition Prediction pilot project, MoDOT will be the first DOT in the country to access a simple-to-use, web-based tool that utilizes both historic real-time data to more accurately predict when road conditions are likely to deteriorate. This will enable MoDOT staff to better prepare for adverse road conditions and strategically deploy crews where they are most needed.

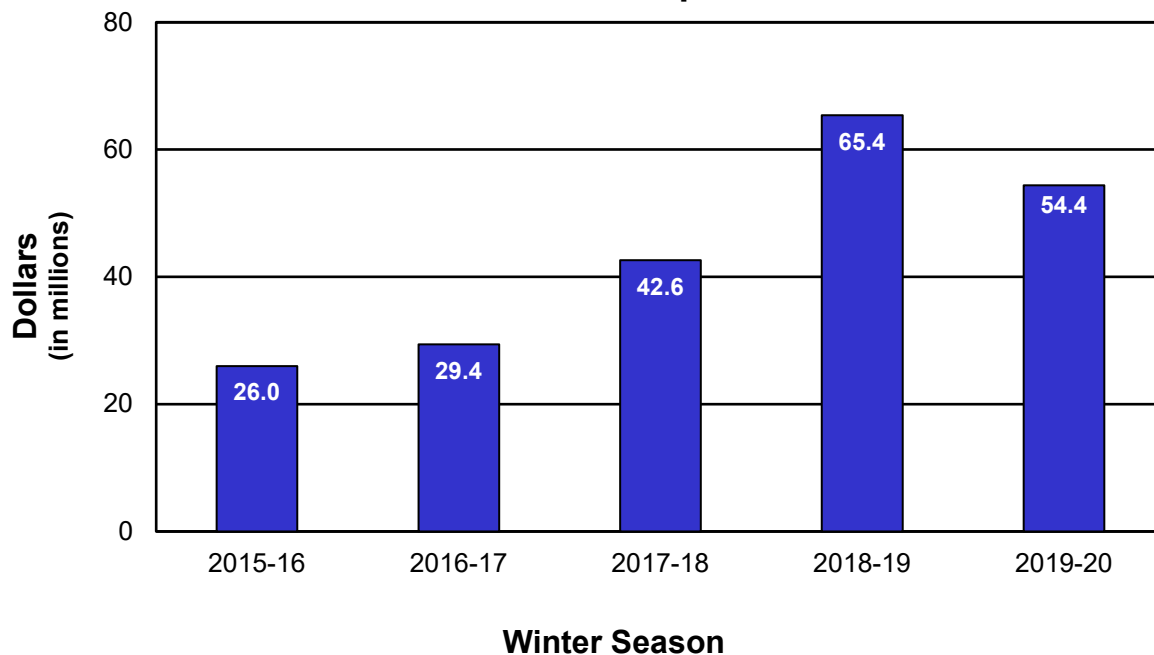
This tool will provide the ability to predict conditions up to eight hours in the future and, conversely, enable accurate after-action reviews of MoDOT's response. This will facilitate improved efficiency of resources and timeliness in response.

Improve Partnerships with Other State Agencies and Leverage Private Sector

Average Time to Meet Winter Storm Event Performance Objectives



Cost of Winter Operations



SERVICE

Providing Outstanding Customer Service, Delivering Efficient and Innovative Transportation Projects, Operating a Reliable Transportation System

- **Improve Project Management Tools**
 - Maintenance Management System
- **Facilities Optimization Strategy Implementation**
- **Fleet Safety and Utilization with Fleet Telematics**
- **Implement Enterprise Resource Planning (ERP)**
- **Update of the State Freight and Rail Plan**
- **Pandemic Response to Maintaining Essential Services**

Improve Project Management Tools

Maintenance Management System

SERVICE CHAMPION:

Eric Schroeter, Assistant Chief Engineer

PROJECT MANAGER

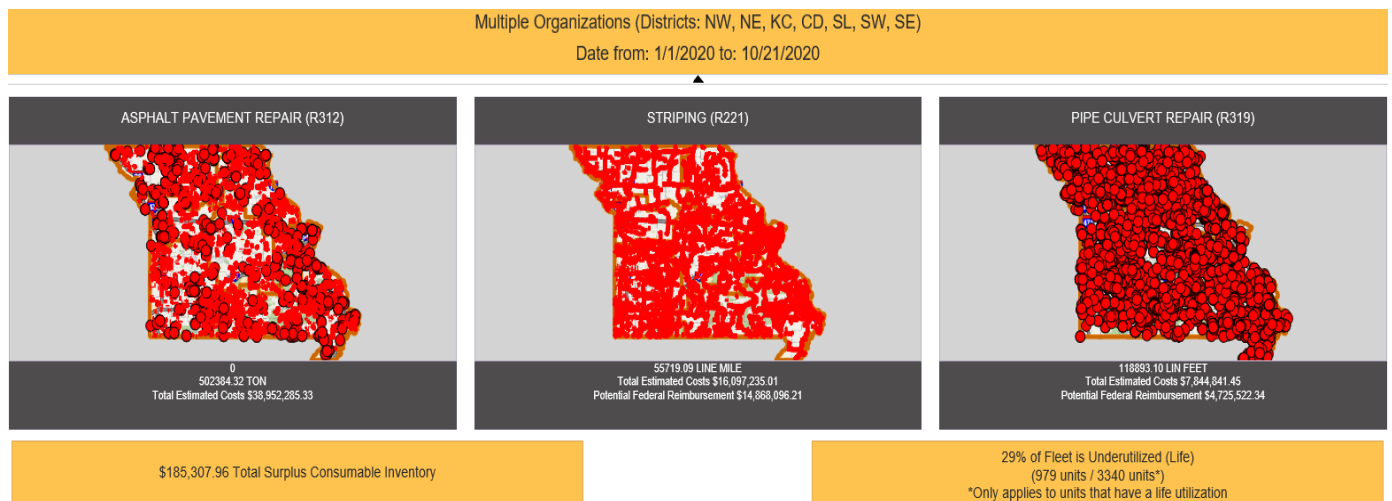
Michael Middleton, Maintenance Liaison Engineer

PURPOSE OF THE PROJECT:

With maintenance staff constituting about 54% of salaried employment at MoDOT and with about 23% of MoDOT's budget used to accomplish maintenance related tasks. The challenges in finding maintenance-related information was substantial due to multiple software programs and difficulty in documenting work.

MoDOT has implemented a Maintenance Management System (MMS) that is a simple to use web-based program for capturing and reporting maintenance work. As of March 15, 2020, all 191 maintenance areas are utilizing MMS. There are nearly 2,700 maintenance workers entering their individual hours worked daily, job location, equipment and materials usage. The MMS Help Desk provides daily guidance to employees on MMS functions. Due to the many benefits and proficiencies MMS offers, utilization is significantly increasing in all areas of MoDOT.

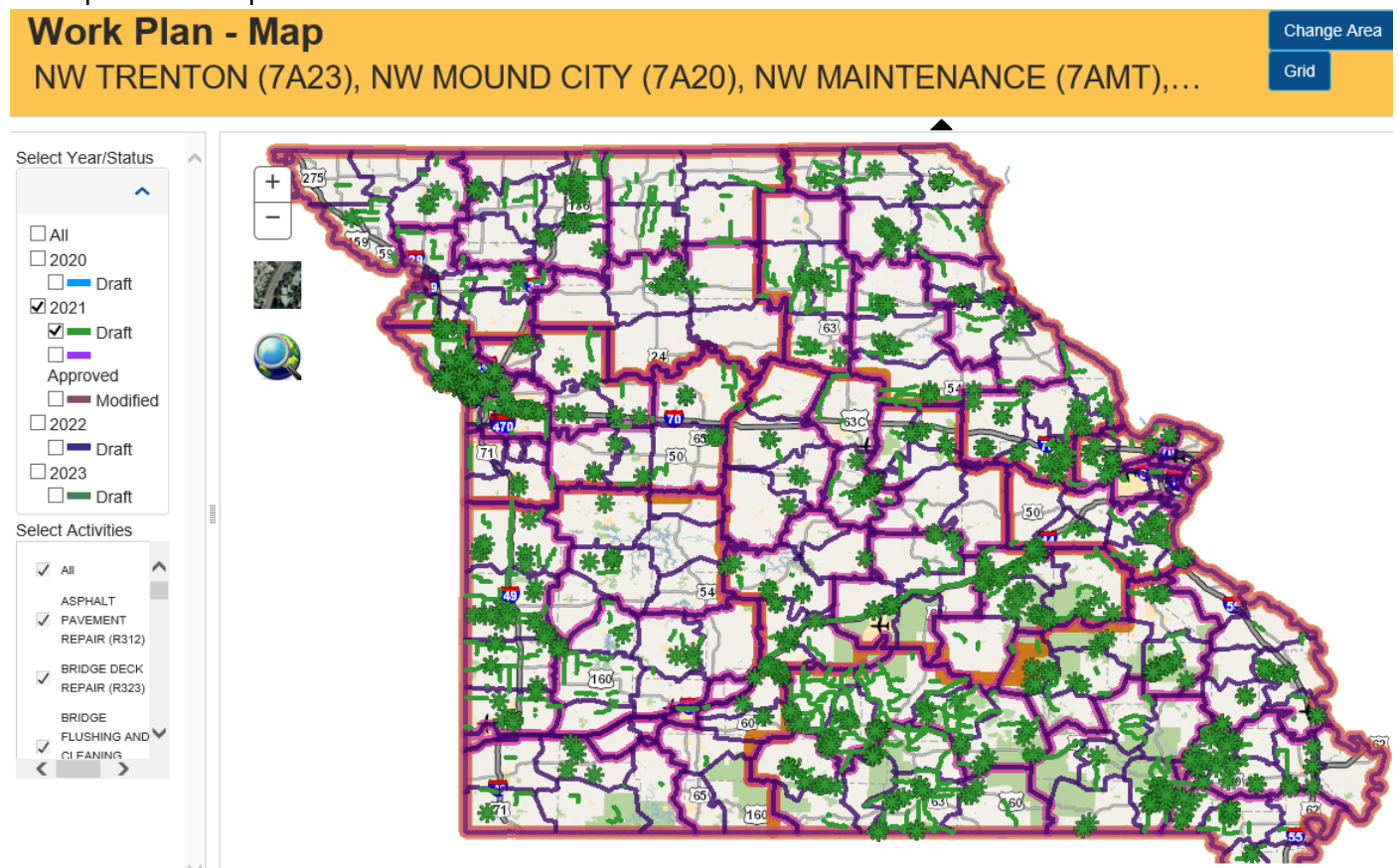
Examples of the results are shown below.



Improve Project Management Tools

Calendar Year Work Plans are being created in MMS starting for 2021. Work Plans within MMS will allow for one location to capture all planned federalized activities and track performance. The MMS Team will begin designing and developing functionality to create a Budgeting tool within MMS. This tool will help District maintenance management, superintendents, and building supervisors easily and effectively know the status of their planned versus current expenses.

Examples of work plans are shown below.



Facilities Optimization Strategy Implementation

Facilities Optimization

SERVICE CHAMPION:

Eric Schroeter, Assistant Chief Engineer

PROJECT MANAGER:

Levi Woods, Central Office General Services Manager

PURPOSE OF THE PROJECT:

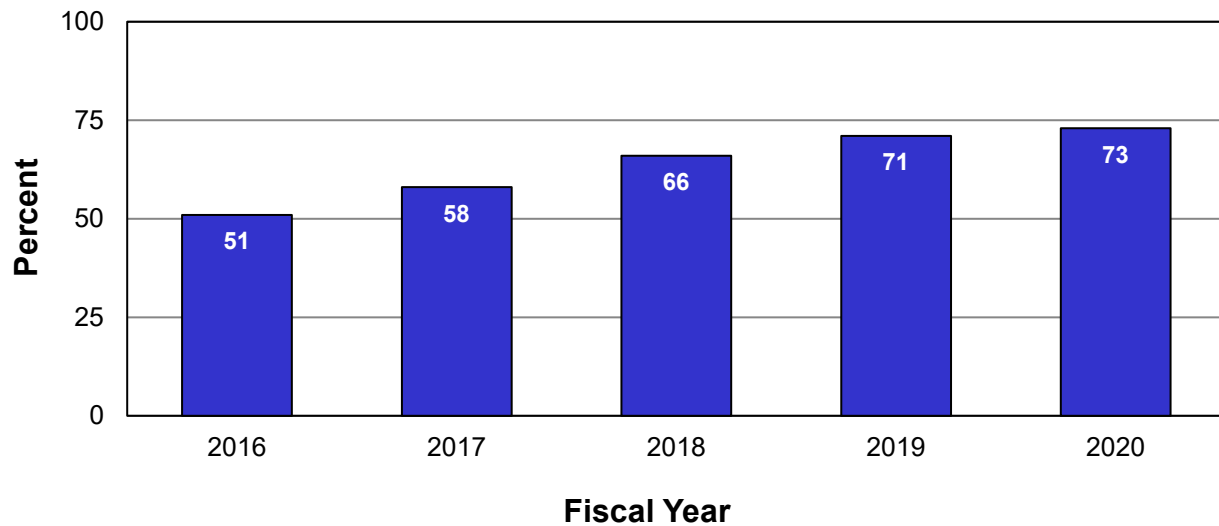
Facilities Optimization provides a similar asset management process for MoDOT facilities as is used by the Department for roadways. Like the Statewide Transportation Improvement Program, MoDOT facilities assets are placed into a rolling five-year budget based on needs. Facilities are currently funded at \$7.2 million annually for Capital Improvement and Asset Management purposes. The charts depict MoDOT's progress toward meeting the goal of having facilities that meet minimum functional needs and the facility systems maintained which keep the facility operational.

Facilities staff utilizes Vanderweil Facility Advisor, a computer-based program, to inventory, with age and condition of all buildings and improvements. Individual systems within the building are inventoried, with all units having a specified lifecycle. Based on actual annual inspections, the asset's lifecycle is determined to be either due for early replacement, replace at end of calculated life, or the lifecycle can be extended based on actual observed conditions. These options allow MoDOT the flexibility to optimize and maximize the useful life of each asset.

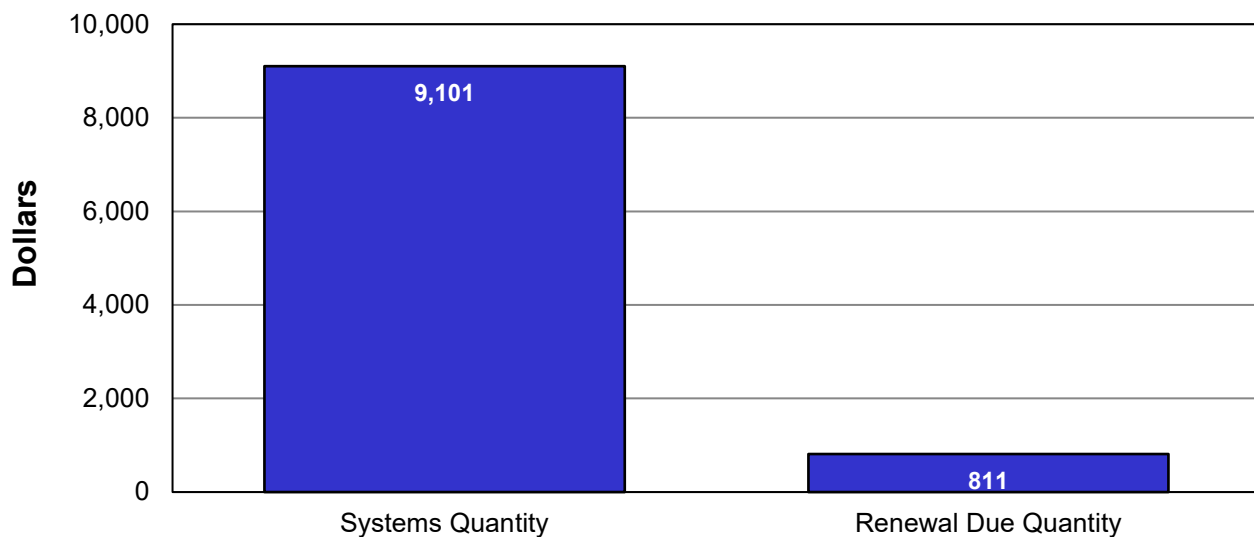
Facilities Asset Management and the Long Term Facilities Plan are currently funded at \$7.2 million annually. In 2014, the Long-Term Facilities Planning Team recognized in order to be functional and operate, facilities have many necessities including space for mechanics to work inside during inclement weather, adequate restrooms for employees, sufficient meeting space for muster sessions and cold storage for operational supplies and equipment. Due to ever changing conditions at MoDOT facilities, the Long Term Facilities Planning Team reviews the needs and allocation of funds for each program on an annual basis. Funds are then allocated to the Capital Asset Preservation Plan (CAPP or Asset Management) and the Long Term Facilities Plan (Capital Improvement Plan- CIP). The \$7.2 million budget is allocated based on needs with \$6.85 million allocated to the CAPP and CIP Plans, with the remaining funds available for asset management of weigh scales, rest area/welcome centers and design consultants.

Fleet and Facilities Optimization Strategy Implementation

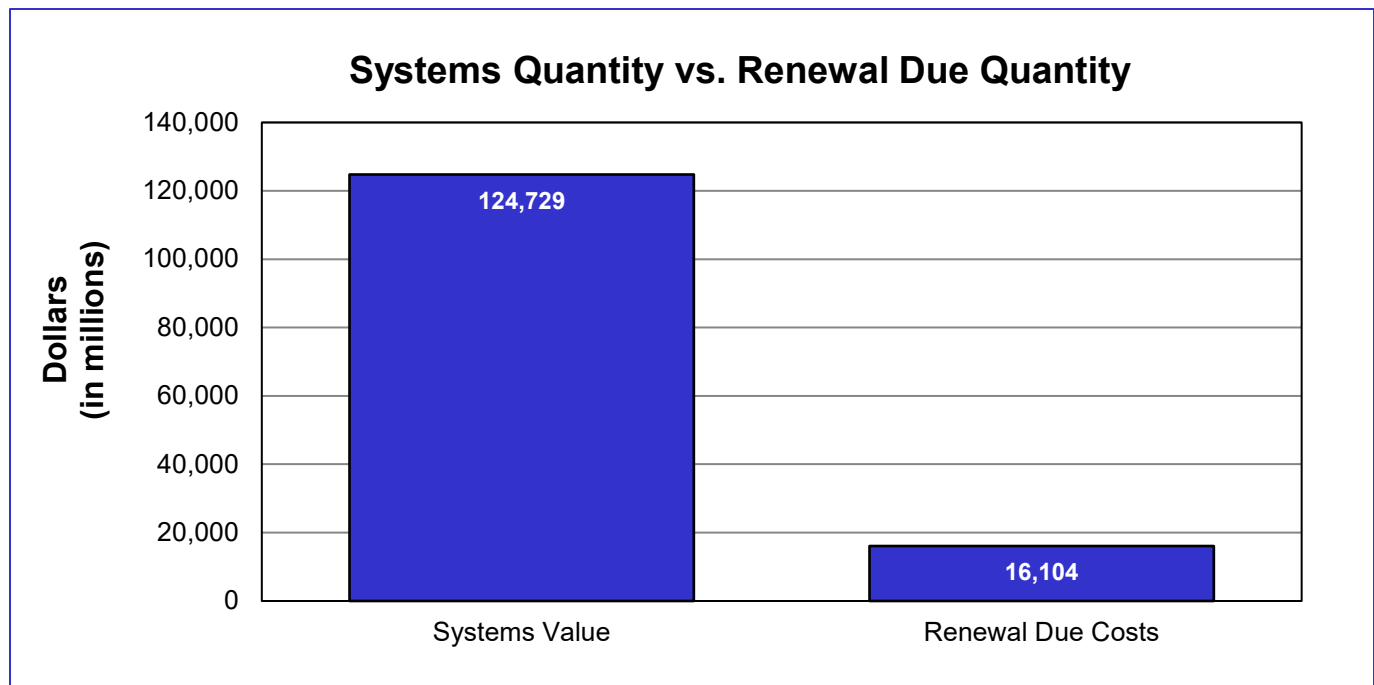
**Percent of Maintenance Facilities
Meeting Functional Goals**



Systems Quantity vs. Renewal Due Quantity



Fleet and Facilities Optimization Strategy Implementation



STABILITY

Managing Our Assets, Stabilizing Resources and Engaging our Workforce, Building a Prosperous Economy for All Missourians

- **Increase Employee Engagement and Recognition**
 - Training and Certifications
- **Research and Deploy Alternative Funding Solutions**
 - Cross-cabinet Collaboration
- **Leverage Innovations to Reduce Costs and Improve Service Quality**

Increase Employee Engagement and Recognition

Employee Training and Certification

STABILITY CHAMPION:

Lester Woods, Chief Administrative Officer

PROJECT MANAGER:

Kim Larimore, Human Resources Administrator

PURPOSE OF THE PROJECT:

Employee turnover not only has a direct impact on MoDOT's ability to preserve and operate a reliable transportation system but also reflects the level of employee engagement within MoDOT. Increasing employee engagement and reducing turnover and its subsequent costs are prudent goals toward organizational stability and wise use of taxpayer dollars.

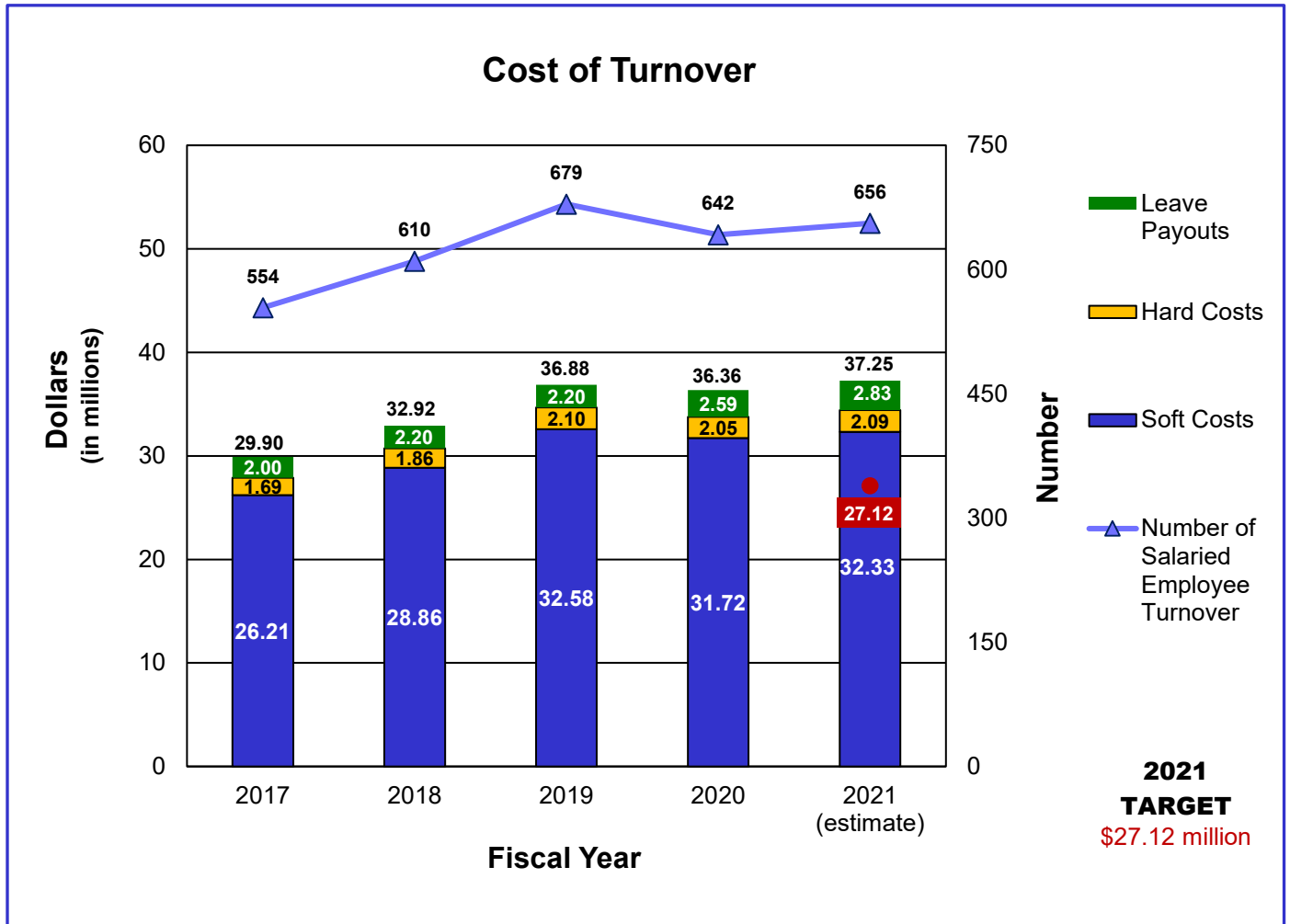
For the first quarter of fiscal year 2021, MoDOT turned over 164 employees. This places MoDOT on track to turn over 656 employees for FY 2021. Applying a Society for Human Resources Management turnover cost calculator to these estimates, we can anticipate the hard cost of backfilling these positions to be \$2.09 million for FY 2021. For the same period, the soft cost of turnover is estimated to be \$32.33 million. However, leave payouts for employees turning over each fiscal year also adds to the overall cost of turnover. For the same period, the leave payout of turnover is estimated to be \$2.83 million for FY 2021. The total of \$37.25 million would be a 2.45 % increase compared to FY 2020 total turnover cost.

Efforts to improve the stability of MoDOT by increasing employee engagement and retention have been implemented and continue.

- **Training and Certifications:**

- **Registered Apprenticeship Program:** The registered apprenticeship program is officially open for enrollment. Its emphasis is on helping people enroll in both the Department of Labor and Veteran's Affairs programs. A focused effort is underway to partner with the Department of Economic Development's Workforce Development Division to enhance MoDOT's recruitment efforts and develop partnerships with Missouri colleges and universities to grant college credit for employees who complete registered apprenticeships with MoDOT. Also, the Missouri Office of Workforce Development and the Missouri Chamber of Commerce has launched the Missouri Apprentice Connect portal, in which MoDOT is now registered. The portal will be an additional way to connect apprentices to registered apprenticeship opportunities and allow the department to market those opportunities. There are currently 4 employees enrolled in the program, and 18 employees who have completed the program in FY 2020.

Increase Employee Engagement and Recognition



Research and Deploy Alternative Funding Solutions

Cross-Cabinet Collaboration

STABILITY CHAMPION:

Lester Woods, Chief Administrative Officer

PROJECT MANAGER:

Liz Prestwood, Policy/Innovation Program Manager

PURPOSE OF THE PROJECT:

The current Missouri vehicle registration fee is based on taxable horsepower, an archaic measure which bears no correlation with vehicle power, vehicle weight or impact caused on infrastructure. Missouri is the only state using taxable horsepower to assess vehicle registration fees.

Missouri has been the recipient of three consecutive Surface Transportation System Funding Alternative (STSFA) federal grants totaling \$4,805,000. The first award was to perform pre-deployment activities for concept feasibility in the amount of \$250,000. Phase two award provided \$2,772,500 and is being used to determine existing system capabilities for implementation and further investigates the impacts to Missouri residents through a Highway Cost Allocation and Revenue Attribution Study (HCARAS) and Rural Urban Transportation Funding Analysis. In 2019, MoDOT received a third STSFA award in the amount of \$1,782,500 for the design and implementation of an MPG based registration fee. During the summer of 2020, MoDOT submitted a fourth grant proposal to receive additional funding to perform system modernization to collect the proposed MPG based registration fee. These grant awards should be announced by the end of the year.

The initial work and deliverables from the Department's STSFA activities modeled how an MPG-based fee could be used to supplement and/or replace the current registration fee schedule. The project team began work with Missouri Department of Revenue in 2018 to explore existing system capabilities to collect this type of fee and identify gaps. This DOR-led study concluded in January 2019. The consultant presented five options of varying costs to implement an MPG-based fee structure. This cross-cabinet effort is ongoing and the preferred implementation option has not been selected. Legislation was filed in the 2019, and the 2020 Missouri General Assembly supports this MPG-based registration fee. Due to COVID-19, the Missouri General Assembly ended their session early and only addressed critical bills like passing the state's budget.

To fully understand impacts of an MPG based registration fee, two additional studies have been completed. A revenue study demonstrated the typical impacts (per year, per mile, per driver, etc.) of highway use and will provided a quantitative basis for the fees attributed to non-gasoline and non-diesel vehicles. As a result of this study, the fee structure proposed has been adjusted to more equitably distribute the cost among highway users. The second study analyzed fees paid by rural and urban drivers under the proposed MPG-based registration fee system, considering the commuting behaviors and vehicle characteristics of highway users statewide. This study showed that urban drivers pay more in commuting costs based on the vehicle profiles and number of miles driven each year.

Alternative Funding Solutions

The principal project goals are to generate revenue consistent with technological trends in the motor vehicle market and to ensure privacy and security for Missouri drivers while utilizing current adaptable technologies to collect and administer the fee.

